



Documentation of ethno-medicinal practices: A case study on tribal forest fringe dwellers of Terai West Bengal in India

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Abstract: The ethno-medicinal practices were documented which were being used by tribal population dwelling forest fringe areas of Terai zone of West Bengal, India on under exploited, non conventional, traditional and indigenous plant species for the sustainable utilization of these resources to cure day to day ailments. A total number of forty seven medicinal plant species belonging to 25 families were documented during the survey period 2012-13, which was used in curing many diseases. Among the families, Euphorbiaceae, Zingiberaceae and Leguminosae were the dominant families that represented four species each. Herb was the highest proportion of plant species 18 (38%) followed by 15 tree species (32%), 8 species of shrubs (17%) and rest were climbers and fern. It was observed that the tribal forest fringe communities of the Terai zone of the West Bengal have a good ethno-medicinal knowledge of using plant resources and developed their own traditional practices to cure day to day diseases.

Keywords: Ailments, Medicinal plant, Sub-himalayan tract, Traditional medicines

INTRODUCTION

Over the centuries the use of medicinal plants based traditional medicines has become an important part of daily life despite the progress in modern medical and pharmaceuticals research because of the side effects of synthetic drugs, the failure of primary healthcare services to cover rural population and spiraling cost of the common drugs (Tiwari, 1999). The importance of traditional medicine as a source of primary health care was first officially recognized by World Health Organization (WHO) in 1978. This kind of health care is traditionally accepted because of easy accessibility, low cost, elaborate patient healer interaction, long term family association, friendly attitude of healer and so on (Lamba and Mehta, 1995). Over 80 percent of the world's population depends directly on plant based medicine for their health care (WHO, 2003). The WHO has described traditional medicine as one of the surest means to achieve total health care coverage of the world's population. Ethno-medicine refers to the study of traditional medical practice which is concerned with the cultural interpretation of health, diseases and illness and also addresses the healthcare seeking process and healing practices of people (Krippner, 2003). More than 20,000 species of higher plants are used as medicines in the traditional treatment practices of indigenous cultures living around the world. In India it is reported that traditional healers use

2500 plant species and medicine (Pei, 2001). The documentation of indigenous knowledge on the utilization of local plant resources by different ethnic groups or communities is one of the main objectives of ethnobotanical research (Shrestha, 1998).

A number of workers investigated the number of plants for their medicoreligious properties of plants as reported by Ranta and Pirata (2007), Singh and Singh (2008) and Sharma and Joshi (2010). The plant diversity has been used by different communities for various purposes such as food, fodder, fuel, medicine, religious and other purposes (Kumar, 2013 and Dangwal *et al.* 2014). Popularity of plant species are declining continuously due to increasing of the demand for other food products and medicinal values. Hence, resulted the degradation of traditional knowledge about the ethnomedicinal values. These genetic resources of forest plant species should be conserved for future use to overcome malnutrition in vegetarian diet and livelihood of the rural as well as tribal communities. So, the survey of the tribal areas for documentation of underutilized plants species is the first step for the conservation and sustainable utilization of these resources to maintain the traditional system of health care system for the population dwelling in forest fringe areas. The present study deals with the indigenous knowledge related with ethnomedicinal uses of plants used by the tribal people of the forest fringe areas of Terai, West Bengal which is a rich repository of diversified medici-

nal plant species, especially in the forest areas of Eastern Sub-Himalayan Tract because of the varied biogeographical zones and climatic conditions. The main objective of this study is to identify, explore indigenous/traditional knowledge and document existing practices on use of common medicinal plants for the treatment of diseases.

MATERIALS AND METHODS

Study area: The study was conducted in four villages namely, Medabari and Rava basti village of Chilapata Forest Range and Baishmile and Pampu Basti village of the Rajabhatkhawa Forest Range of West Bengal during 2012 – 13. The Chilapata Forest Range (latitude 26°32'N and longitude 89°22'E; altitude 90m msl) is 20 km from Pundibari in Soth-western direction under Cooch Behar Forest Division with adjoining areas of Cooch Behar, Jalpaiguri and Bhutan. Rajabhatkhawa Forest range (latitude 26°36'N and longitude 89°40'E; altitude 120m msl) under Jalpaiguri Forest Division, a part of Buxa Tiger Reserve which is 40 kms away from Pundibari.

The inhabitants of the survey area under Rajabhatkhawa forest range comprise about the different communities of the scheduled tribe namely, 35% Santhals, 30% Rava, 2% Metch and rest 33% Rajbanshi. The majority of the population (>80%) in the survey area under Chilapata forest range comprised two different communities of the scheduled tribe namely, Ravas and Oraons. It was found from the survey that

collecting minor forest products including medicinal plants are one of the important sources of livelihood of the targeted population. For subsistence, they also practice agriculture, piggery, poultry, dairy and goat rearing.

Data was collected through a combinations of tools and techniques of the questionnaires, Participatory Rural Appraisal (PRA) technique, focused group interview and discussion among 100 people from four villages (25 people per village). Information on curative values as well as medicinal values of different plant species were gathered through the personal interview. The local names of the plants and folklore claims of the respective uses were verified by showing the same specimen to the elder people and cross checking was finally confirmed after consultation with herb healers and ayurvedic practioners of the same locality.

RESULTS AND DISCUSSION

During the survey period about 47 plant species were documented and are presented in table 1. It was observed that among all the life forms, 18 herbs namely, *Achyranthus aspera* L., *Acorus calamus* L., *Adhatoda vasica* Nees, *Andrographis paniculata* Wall.ex Nees, *Centella asiatica* L., *Curcuma caesia* Roxb., *Curcuma longa* L., *Datura metel* L., *Elettaria cardamomum* Maton, *Emblica officinalis*, *Eupatorium ayapana* Vent., *Euphorbia hirta* L., *Leucus aspera* (Willd.), *Piper longum* L., *Polygonum dichrotomum* Blume, *Saussurea lappa* C.B.Clarke, *Solanum xanthocarpum*

Table. 1. List of the important medicinal plants.

S.N.	Scientific name	Common name	Family	Habit
1	<i>A. vasica</i>	Vasaka	Acanthaceae	Herb
2	<i>A. paniculata</i>	Kalmegh	Acanthaceae	Herb
3	<i>A. aspera</i>	Apang/Apamarg	Amaranthaceae	Herb
4	<i>L. coromondelica</i>	Geol/Jiga	Anacardiaceae	Tree
5	<i>A. scholaris</i>	Chatim	Apocynaceae	Tree
6	<i>A. calamus</i>	Bach	Araceae	Herb
7	<i>C. gigantean</i>	Akanda	Asclepidiaceae	Shrub
8	<i>O. indicum</i>	Totala	Bignoniaceae	Tree
9	<i>T. arjuna</i>	Arjuna	Combretaceae	Tree
10	<i>T. bellirica</i>	Bahera	Combretaceae	Tree
11	<i>T. chebula</i>	Haritaki	Combretaceae	Tree
12	<i>E. ayapana</i>	Bisalyaka rani/Ayapan	Compositae	Herb
13	<i>S. lappa</i>	Kur	Compositae	Herb
14	<i>E. officinalis</i>	Amloki	Euphorbiaceae	Tree
15	<i>E. hirta</i>	Lal Dudhi	Euphorbiaceae	Herb
16	<i>J. curcas</i>	Varenda	Euphorbiaceae	Shrub
17	<i>R. communis</i>	Arenda	Euphorbiaceae	Shrub
18	<i>C. asiatica</i>	Thankuni/Manimuni	Hydrocotylaceae	Herb
19	<i>L. aspera</i>	Dandakalas	Labiatae	Herb
20	<i>O. sanctum</i>	Tulsi	Labiatae	Shrub
21	<i>C. fistula</i>	Amaltas/Sondal	Leguminosae	Tree
22	<i>M. pruriens</i>	Alkusi	Leguminosae	Climber
23	<i>S. indica</i>	Ashoka	Leguminosae	Tree
24	<i>S. bisponosa</i>	Jayanti	Leguminosae	Tree
25	<i>A. wallichii</i>	Lali	Meliaceae	Tree

Table 1. Contd.

26	<i>A. indica</i>	Neem	Meliaceae	Tree
27	<i>S. herandifolia</i>	Nimoko	Menispermaceae	Climber
28	<i>T. cordifolia</i>	Gulancha	Menispermaceae	Climber
29	<i>M. fragrans</i>	Jaiphal/Jaitri	Myristicaceae	Tree
30	<i>P. guajava</i>	Peyara	Myrtaceae	Tree
31	<i>H. indicus</i>	Anantamul	Periplocaceae	Shrub
32	<i>P. longum</i>	Pipali	Piperaceae	Herb
33	<i>P. nigrum</i>	Gol marich	Piperaceae	Climber
34	<i>P. retrofactum</i>	Choi	Piperaceae	Climber
35	<i>P. dichrotomum</i>	Biskathali	Polygonaceae	Herb
36	<i>A. marmelos</i>	Bael	Rutaceae	Tree
37	<i>D. metel</i>	Kalo Dhatura	Solanaceae	Herb
38	<i>S. xanthocarpum</i>	Kantakari	Solanaceae	Herb
39	<i>W. somnifera</i>	Aswagandha	Solanaceae	Shrub
40	<i>C. dentate</i>	Bisdhenkia	Thelypteridaceae	Fern
41	<i>C. indicum</i>	Bamunhati	Verbenaceae	Shrub
42	<i>V. nigundo</i>	Nisindha	Verbenaceae	Shrub
43	<i>C. caesia</i>	Kali haldi	Zingiberaceae	Herb
44	<i>C. longa</i>	Haldi	Zingiberaceae	Herb
45	<i>E. cardamomum</i>	Chota ellachi	Zingiberaceae	Herb
46	<i>Z. officinale</i>	Adha/Adrak	Zingiberaceae	Herb
47	<i>T. terrestris</i>	Gokhur kanta	Zygophyllaceae	Herb

Schrad & Wendl., *Tribulus terrestris* L., *Zingiber officinale* Rosc., 15 trees namely, *Aegle marmelos* (L.) Corr., *Alstonia scholaris* (L.) R.Br., *Amoora wallichii* King, *Azadirachta indica* A. Juss, *Cassia fistula* L., *Embllica officinalis* Gaertn, *Lannea coromondelica* (Houtt.) Merr., *Myristica fragrans* Houtt., *Oroxylum indicum* L., *Psidium guajava* L., *Saraca indica* Auct. non L., *Sesbania bisponosa* (Jacq.) W.F. Wight, *Terminalia arjuna* (Roxb.) Wight & Arn., *Terminalia bellirica* (Gaertn.) Roxb., *Terminalia chebula* Retz., 8 shrubs namely, *Calotropis gigantea* Ait., *Clerodendron indicum* (L.) Kuntze, *Hemidesmus indicus* (L.) Schult., *Jatropha curcas* L., *Ocimum sanctum* L., *Ricinus communis* L., *Vitex nigundo* L., *Withania somnifera* L., 5 climbers (namely, *Mucuna pruriens* L., *Piper nigrum* L., *Piper retrofactum* Vahl., *Stephania herandifolia* Walp., *Tinospora cordifolia* Willd. and 1 fern specie namely, *Christella dentate* (Forssk.) Brownsey & Jermy were used by the tribal population for their health care. These life forms belonged to 25 families, among which Euphorbiaceae, Leguminoseae and Zingiberaceae were the dominant with four species each followed by Piperaceae, Solanaceae and Combretaceae. Earlier, Behera and Nayak (2012) have reported 44 wild plant species belonging to 30 families and 36 genera that are most used by the Kandha and Kolha tribes for treatment different diseases and disorder where as Kalita and Phukan (2010) have mentioned 24 different plant species were used traditionally by the Tai Ahom people of Dibrugarh district of Assam. Large numbers of medicinal plants are reported to be abortifacient, analgesic, antiseptic antitubulous, astringent,

antipyretic etc. and are used in traditional system of health care (Jain, 1991; Acharya, 2012; Kumar, 2013 and Dangwal et al, 2014). The findings of the present work are similar with the findings of the above workers.

Diseases like indigestion, cough, cold, asthma, heart problems, skin diseases, weakness, rheumatism, dysentery etc. are cured by these plants and are found to be very effective when taken in proper doses. Respective uses and doses were verified by consultation with herb healers and ayurvedic practioners of the same locality. The mode of preparation and the doses of the medicines prepared from the plant parts were collected from the respondents and other various secondary sources are represented in table 2. It was found that among the plant parts leaves of most of the plant species were widely used for the treatment. The leaves of 17 species were being used by the tribal population for more than 100 years..

Conclusion

It was observed that the tribal communities have a good ethno-medicinal knowledge of using plant resources and developed their own traditional practices to cure day to day diseases. Besides this information, the data provides the glimpses of light for further scientific investigation of principal active compounds which are responsible for curative properties of these plant species.

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Table. 2. Plant parts used to cure different diseases along with mode of preparation and dosages.

S.N.	Scientific name	Parts used	Diseases cured	Mode of preparation and dosage
1	<i>A. aspera</i>	Root	Indigestion and dysentery	Half cup of root decoction once a day.
2	<i>A. calamus</i>	Rhizome	Indigestion and overfullness	Rhizome powder taken with hot water.
3	<i>A. vasica</i>	Leaf	Cough and cold	A mixture of powdered form of <i>Piper longum</i> (0.61g) along with one teaspoonful leaf juice each of <i>Adhatoda vasica</i> and <i>Ocimum sanctum</i> .
4	<i>A. marmelos</i>	Leaf, fruit	Indigestion and constipation	Fruit plup mixed with water taken for 3-7 days or 3-5 bael leaves taken in the morning.
5	<i>A. scholaris</i>	Bark	White pigmentation	Bark powder to be applied on the affected areas.
6	<i>A. wallichii</i>	Fruit	Improving weakness after delivery	Fruits boiled with water thereafter crushed, dried and powdered and taken.
7	<i>A. paniculata</i>	Leaf, twigs	Improve liver function	Extracts have showed protection on liver from various chemicals such as carbon tetrachloride.
8	<i>A. indica</i>	Leaf, stem	Dental problems	Leaves and stem are rubbed against the teeth.
9	<i>C. gigantean</i>	Leaf, latex	Skin diseases	Latex is rubbed on the itching areas.
10	<i>C. fistula</i>	Leaf	Hepatoprotection	The extract at a dose of 400 mg/kg body wt. when taken orally lowers bilirubin and alkaline phosphatase (ALP) in liver.
11	<i>C. asiatica</i>	Leaf	Dysentery	Juice extract should be taken in empty stomach at early morning
12	<i>C. dentate</i>	Leaf	Cuts and wounds	Leaf extract used for immediate recovery from bleeding of cuts and wounds
13	<i>C. indicum</i>	Root	Cold, cough and asthmatic problem	Powdered form of 10g each of <i>Piper nigrum</i> , <i>P. longum</i> , <i>Zingiber officinale</i> , <i>Clerodendron indicum</i> , roots of <i>Saussurea lappa</i> and <i>Piper retrofractum</i> used for partial relief from asthma.
14	<i>C. caesia</i>	Rhizome	Rheumatism	Paste of rhizome applied in the affected area for partial relief.
15	<i>C. longa</i>	Rhizome	Skin diseases, jaundice	Paste of <i>Curcuma longa</i> and <i>Curcuma caesia</i> with mustard oil is very effective. Powder mixed with curd taken internally for jaundice.
16	<i>D. metel</i>	Leaf	Asthma	Leaf dust smoked with cow dung cake is effective for immediate relief
17	<i>E. cardamomum</i>	Capsule	Vitality and weakness	One teaspoonful mixture of <i>Piper nigrum</i> , <i>P. longum</i> , <i>Myristica fragrans</i> and <i>Elettaria cardamomum</i> with honey or milk once at bed time.
18	<i>E. officinalis</i>	Fruit	Scabies	Paste prepared by mixing 100g fruit powder along with coconut oil and applied for 3 days.
19	<i>E. ayapana</i>	Leaf	Cut and wounds	Leaves crushed and applied externally on the wounds to check bleeding.
20	<i>E. hirta</i>	Whole plant	Piles	4 teaspoonfuls of bark decoction taken orally twice a day after meals.
21	<i>H. indicus</i>	Root	Asthma	Roots mixed with milk given thrice daily for seven days.

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Table 2. Contd.....

22	<i>J. curcas</i>	Seed, root	Dental problems	Rubbing teeth with the stem is effective.
23	<i>L. coromondelica</i>	Gum (exudates from stem bark)	Piles	The gum is fried thoroughly and ground and mixed with water and made into pills.
24	<i>L. aspera</i>	Leaf, twigs	Body pain	Leaves taken as vegetable is useful against bodyache.
25	<i>M. pruriens</i> L.	Seed	Vitality and weakness	Seeds boiled with milk for purification thereafter seeds are dried and powdered.
26	<i>M. fragrans</i>	Fruit	Cold, cough	Very small dose of the fruit extract is taken orally.
27	<i>O. sanctum</i>	Leaf	Cold, cough, asthmatic and dental problem	Tea of leaves along with <i>Piper nigrum</i> is prepared and taken orally for cough, cold and asthma. Dried <i>Zingiber officinale</i> enclosed with <i>Ocimum sanctum</i> leaves gives relief in case of toothache.
28	<i>O. indicum</i>	Bark	Jaundice	Bark soaked in water overnight and the extract taken early in the morning is effective.
29	<i>P. longum</i>	Seed	Cough, sore on tongue	3 to 4 seeds mixed with honey and taken orally.
30	<i>P. nigrum</i>	Seed	Rheumatism	20g each of <i>Piper nigrum</i> , <i>Piper longum</i> dried <i>Zingiber officinale</i> , <i>Ricinus communis</i> (roots) and <i>Vitex negundo</i> (leaves) boiled with 1 litre of water and finally to come 250ml (i.e. decoction form). From this 2 ml decoction is taken twice a day (morning and evening).
31	<i>P. retrofractum</i>	Stem	Cold, cough and asthmatic problems	One teaspoonful mixture of equal quantities of Trikadu (i.e. a mixture of equal quantities of <i>Piper nigrum</i> , <i>Piper longum</i> and <i>Zingiber officinale</i>) and <i>Piper retrofractum</i> is taken with honey in empty stomach at morning.
32	<i>P. dichrotomum</i>	Leaf, tender shoot	Dental problems	Rinsing of mouth with a solution prepared from 250 g leaves and tender stem mixed with 10gm of alums boiled with 1 litre of water upto final volume of 500 ml water for 2-3 times in a day in case of adult.
33	<i>P. guajava</i>	Leaf, shoot tip	Indigestion	Juice extract from equal quantities of crushed <i>Psidium guajava</i> and fresh <i>Terminalia arjuna</i> used against indigestion.
34	<i>R. communis</i>	Root	Lumbago and sciatica	A decoction of the roots is used in the treatment.
35	<i>S. indica</i>	Bark	Vitality and weakness	Half cup (125 ml.) of bark decoction taken twice a day or 7 days.
36	<i>S. lappa</i>	Root	Respiratory disorders	The dried roots are macerated in warm water then the oil is extracted which is effective in relaxing bronchial muscles.
37	<i>S. bisponosa</i>	Leaf	Eczema	Use of leaf paste externally is effective.
38	<i>S. xanthocarpum</i>	Root	Cold and cough	Four teaspoonfuls of root decoction once a day for seven days to cure cold and cough.
39	<i>S. herandifolia</i>	Leaf	Indigestion and dysentery	Half cup of juice extract from leaves taken once a day on empty stomach at early morning.

Contd.....

Contd.....

40	<i>T. arjuna</i>	Bark	Heart diseases	Bark extract at doses of 500 mg every 8 hours for up to 3 months
41	<i>T. bellirica</i>	Fruit	Cough, cold, asthma disease	3 – 6 gm of fruit powder taken daily
42	<i>T. chebula</i>	Fruit	Rheumatism	Decoction of trifala (i.e.a mixture of equal quantities of <i>Terminalia chebula</i> , <i>T. bellerica</i> and <i>Emblca officinalis</i>) is prepared and four teaspoonfuls taken once a day.
43	<i>T. cordifolia</i>	Stem	Rheumatism, jaundice	Stems boiled with sesame oil @ 1:5 ratio until frothing will stop. Massage with this oil gives relief 1-2 teaspoon juice extract from fresh stem and honey for rapid cure of jaundice.
44	<i>T. terrestris</i>	Fruit	Male sterility	About 4 gm powder given twice a day with milk and honey.
45	<i>V. nigundo</i>	Leaf	Arthritis	Essential oils from leaves are applied to the affected area.
46	<i>W. somnifera</i>	Root	Impotency	About 4 gm powder given twice daily (morning and at night before going to bed) with milk.
47	<i>Z. officinale</i>	Rhizome	Cold and flu, loose motion of children	A mixture of dry <i>Zingiber officinale</i> , leaves of <i>Cassia fistula</i> and sugar or simply hot <i>Zingiber officinale</i> drink is highly effective. Rhizome taken with honey is effective in loose motion in children.

Source : Respondents from survey areas and herb healers and ayurvedic practitioners of the same locality.

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